

PATENT SPECIFICATION



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PROVISIONAL SPECIFICATION

Improvements in or relating to Surface High Speed Craft

We, J. SAMUEL WHITE & COMPANY LIMITED, a Company registered under the Laws of Great Britain, of East Cowes, Isle of Wight, and HERBERT CHARLES CAREY, British Subject, of Hampton House, Birmingham Road, Cowes, Isle of Wight, and ARTHUR THOMAS WALL, British Subject, of the above Company's address, do hereby declare the nature of this invention to be as follows:—

This invention relates to surface high speed craft of the type in which the hull of the vessel is provided with downwardly directed struts which carry hydrofoils on which, when speed is attained, the hull is supported above the surface of the water. The object of the present invention is to effect certain improvements in the structure of the struts and to enable them to be employed for certain subsidiary purposes.

According to this invention any one or more of the struts which project downwardly from beneath the hull is formed hollow and carries a set of hydrofoils so that they project from opposite sides of the strut. Such a hollow strut saves weight and, moreover, the strut, in addition to its primary use as carrying the hydrofoils, may be employed for subsidiary purposes. For example, a transmission shaft may be rotatably mounted within and may extend throughout the strut and by means of gearing at its ends this shaft will serve for transmitting the drive from the engine within the hull to a propeller which is carried on a short shaft at the lower end of the strut. Again, the hollow strut may serve as a means for conveying cooling water through the strut from an opening in its lower end to the engine in the hull. The conveyance of cooling water through the strut by means of suitable piping may be combined with the mounting of a rotatable shaft within the strut through which the propeller is driven.

A hollow strut may be mounted if desired in the underside of the hull so that the strut can be rotated about a vertical axis for steering purposes. The steering properties of such a strut will be enhanced if the propeller is carried, as

above indicated, at the lower end of the strut and this propeller is driven through shafting enclosed in the strut.

The strut may be formed hollow throughout its length with the exception of its lower end, which is formed solid or closed, or the strut may be hollowed out as to only part or parts of its length, when at one or more intermediate points the strut may be formed solid. For example, if shafting for driving the propeller is arranged within the strut, the strut may be formed solid at suitable points where bearings are disposed for the shafting.

Externally the strut is preferably given a streamline form in transverse horizontal sections. The hydrofoils are mounted on the strut and themselves arranged as may be found desirable or convenient. The dimensions of the strut with respect to its width, as measured in the fore and aft direction, and as to its thickness, that is to say as measured in the transverse direction, may vary as found desirable, for example for the purpose of giving the necessary strength. The strut may be made of wood and hollowed out of the solid or it may be built up, as for instance in a manner known in the construction of hollow spars for vessels. Alternatively, the strut may be formed of suitable metal. The strut may be mounted on and connected to the hull in such manner as is found convenient. For example, it may be connected directly to a framework of suitable structure which is enclosed within an outer skin or casing through which the strut passes. Alternatively, as indicated above, the strut may be so mounted on the underside of the hull that the strut can be rotated about a vertical axis.

Where the hollow strut is employed to enclose a shaft through which the propeller is driven, the propeller is mounted on a short length of shafting which is carried in bearings in a suitably streamlined casing which encloses the gearing interposed between the short propeller shaft and the transmission shaft which passes throughout the strut. On the upper end of the transmission shaft is arranged other gearing through which the drive is transmitted from the engine crankshaft.

Such an arrangement may be employed in a strut which is itself mounted so as to be rotatable about a vertical axis.

Where the hollow strut serves as a means of conveying cooling water to the engine, this water may flow directly through the strut from an opening formed in the leading edge at or towards the lower end of the strut. Alternatively and preferably, piping is arranged within the hollow strut through which the water flows from an orifice in the leading edge at the lower end of the strut. At its upper end such piping or the hollow interior of the strut, if separate piping is not employed, communicates with the

engine water cooling system by suitable piping and a flexible connection. The flow of water through this piping to the engine may be induced by the passage of the strut through the water, but this flow may be assisted if desired by a pump driven by the engine.

Conveniently all the hydrofoil-carrying struts on the underside of the vessel are formed hollow in accordance with this invention, but if desired certain of these struts may be formed solid.

Dated this 25th day of June, 1935.

KILBURN & STRODE,
Agents for the Applicants.

COMPLETE SPECIFICATION

Improvements in or relating to Surface High Speed Craft

We, J. SAMUEL WHITE & COMPANY LIMITED, a Company registered under the Laws of Great Britain, of East Cowes, Isle of Wight, HERBERT CHARLES CAREY, British Subject, of Hampton House, Birmingham Road, Cowes, Isle of Wight, and ARTHUR THOMAS WALL, British Subject, of the above Company's address, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to surface high speed craft of the type in which the hull of the vessel is provided with downwardly directed struts which carry hydrofoils on which, when speed is attained, the hull is supported above or partly above the surface of the water. The object of the present invention is to effect certain improvements in the structure of the struts and to enable them to be employed for certain subsidiary purposes.

A surface craft according to the invention is provided with three or more struts projecting downwardly from the hull and each furnished with a set of hydrofoils carried solely by that strut so that they extend from opposite sides of the strut transversely to the length of the hull, at least one of the struts being hollow or longitudinally bored, and an opening at or near the lower end of the strut in its leading edge below the part thereof which rises out of the water at maximum speeds, so that cooling water will at all speeds enter the inlet opening and flow through the strut to an engine arranged within the hull.

Each strut is conveniently rearwardly directed or inclined with the leading edge of the strut either rectilinear or curved in profile and the convex side of the curve directed towards the forward end of the

hull. The conveyance of cooling water through the strut by means of suitable piping may be combined with the mounting of a rotatable shaft within the strut through which the propeller is driven.

The strut may be formed hollow throughout its length with the exception of its lower end, which is formed solid or closed, or the strut may be hollowed out as to only part or parts of its length, when at one or more intermediate points the strut may be formed solid. For example, if shafting for driving the propeller is arranged within the strut, the strut may be formed solid at suitable points where bearings are disposed for the shafting.

Two constructions each embodying the invention are illustrated somewhat diagrammatically and by way of example in the accompanying drawings, in which

Figure 1 illustrates one construction in perspective,

Figure 2 is a section on the line 11—11 of Figure 1,

Figure 3 shows the rearmost strut on a larger scale and as viewed from the forward end of the vessel, and

Figure 4 illustrates a modified arrangement in vertical section.

In the construction shown in Figure 1 the hull A containing the engine B is furnished with three struts C, C¹ and C², the struts C and C¹ being arranged side by side and laterally spaced apart beneath the forward part of the vessel whilst the strut C² extends downwards from the after part of the vessel and on the central fore-and-aft line thereof. Each of the struts C, C¹ and C² is curved towards the stern of the vessel and is furnished with a set of hydrofoils D carried solely by that strut and extending from opposite sides thereof transversely to the length of the vessel.

The rearmost strut C² has an internal

bore or pipe E the lower or inlet end E¹ of which opens in the leading edge of the strut somewhat above the solid lower end of the strut so that the inlet opening lies below the part of the strut which rises out of the water at maximum speeds. The bore E communicates through a pipe F with the cooling jacket of the engine B so that when the vessel is moving forward water enters through the opening E¹, at all speeds of the vessel, and flows upwards through the bore E and pipe F to the cooling jacket of the engine from which it is discharged. The flow of water through the pipe or bore E may be induced solely by the movement of the strut C² through the water or this flow may be assisted, if desired, by a pump driven by the engine B. With a view to providing for regulation of the flow of cooling water to the engine means, such for example as a flow regulating valve in the pipe F, may be provided for increasing or decreasing the rate of delivery of water from the pipe or bore E to the cooling jacket of the engine.

Figure 4 illustrates a modified arrangement in which a strut N secured beneath the after part of the vessel A, and furnished with hydrofoils as described with reference to Figure 1, is formed hollow to receive not only a transmission shaft P through which the drive is transmitted from the engine B² to the propeller M, but also a pipe Q opening at Q¹ in the leading edge of the strut N and communicating through a flexible pipe Q² with the cooling water jacket of the engine B².

It will be understood that a vessel embodying the invention is furnished with at least three struts but that the arrangement of these struts may vary to suit requirements. Thus, for example, two or more struts may be laterally spaced apart so as to extend downwards from the forward portion of the vessel, with one or more struts extending downwards from the after part of the vessel, or one or more struts may extend downwards from the forward part of the vessel and two or more from the after part. One or several of the struts may be hollow or internally bored for supplying cooling water to the engine or engines. Further, either a single strut or two or more struts may be mounted to rotate about an upwardly directed axis for steering purposes, such rotary strut or struts extending downwards either from the forward portion of the vessel or from a part or parts at or towards the after end.

In each of the constructions above described the struts are given a streamline form in transverse horizontal sections. The dimensions of each strut with respect to its width, as measured in the

fore-and-aft direction, and as to its thickness, that is to say as measured in the transverse direction, may vary as found desirable, for example for the purpose of giving the necessary strength. The strut may be made of wood and hollowed out of the solid or it may be built up, as for instance in a manner known in the construction of hollow spars for vessels. Alternatively, the strut may be formed of suitable metal. The strut may be mounted on and connected to the hull in such manner as is found convenient. For example, it may be connected directly to a framework of suitable structure which is enclosed within an outer skin or casing through which the strut passes.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. In a surface craft of the type specified, the combination with the hull, of three or more struts projecting downwards from the hull, each strut being furnished with a set of hydrofoils carried solely by that strut so that they extend from opposite sides of the strut transversely to the length of the hull, at least one of the struts being hollow or longitudinally bored, and an opening at or near the lower end of the strut in its leading edge below the part thereof which rises out of the water at maximum speeds, so that cooling water will at all speeds enter the inlet opening and flow through the strut to an engine arranged within the hull.

2. In a surface craft of the type specified, the combination with the hull, of three or more struts projecting downwards from the hull, each strut, which is furnished with a set of hydrofoils carried solely by that strut so that they extend from opposite sides of the strut transversely to the length of the hull, being rearwardly directed or inclined with the leading edge of the strut either rectilinear or curved in profile and the convex side of the curve directed towards the forward end of the hull, at least one of the struts being hollow or longitudinally bored, and an opening at or near the lower end of the strut in its leading edge below the part thereof which rises out of the water at maximum speeds so that cooling water will at all speeds enter the inlet opening and flow through the strut to an engine arranged within the hull.

3. In a surface craft of the type specified the combination with the hull and hydrofoil-carrying struts, at least one of which is hollow or longitudinally bored, as claimed in Claim 1, of a shaft mounted

to rotate within the hollow strut and serving to transmit the drive from an engine within the hull to a propeller carried at or near the lower end of the strut, and a
5 pipe or conduit within the strut through which pipe cooling water is conveyed from the inlet opening in the leading edge of the strut to the engine.

4. A surface craft having hydrofoil-carrying struts one of which is internally 10 bored as described with reference to Figures 1, 2 and 3, or Figure 4 of the accompanying drawings.

Dated this 18th day of May, 1936.

KILBURN & STRODE,
Agents for the Applicants.

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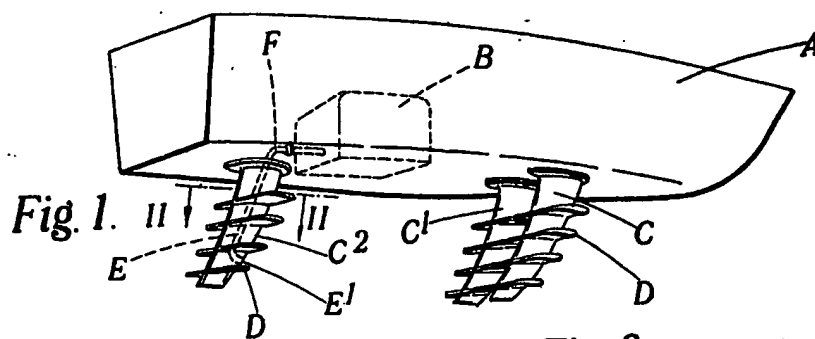


Fig. 1.

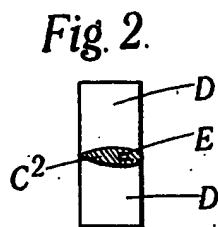


Fig. 2.

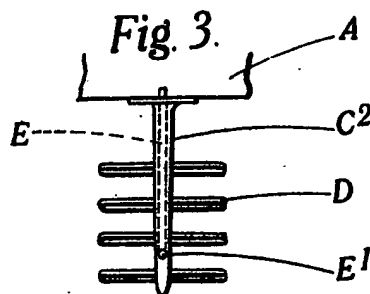


Fig. 3.

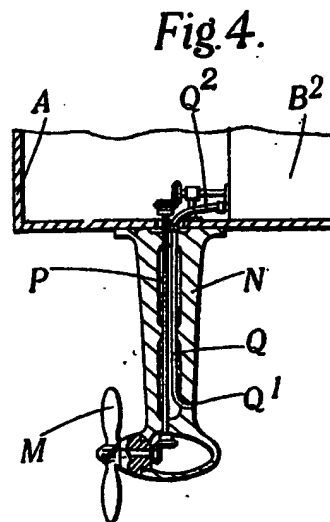


Fig. 4.

Malby & Sons, Photo-Litho.